



INSTITUTO  
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## PhD in Forensic Sciences

### Research Area: Forensic Toxicology

**Title:** Novel Psychoactive Substances and Parkinson Disease: Molecular and cellular mechanisms of  $\alpha$ -synuclein aggregation in the presence of synthetic cannabinoids and cathinones

Neurodegenerative disorders result from the progressive loss of specific neuronal populations leading to the appearance of the clinical symptoms that are characteristic of each disorder. The major known risk factor for the development of these diseases is ageing. However, genetic and environmental factors can contribute for the disease development. Some drugs of abuse clearly induce particular forms of neurodegenerative diseases, such as leukoencephalopathies and fatal leukoencephalopathies among heroin smokers and Parkinson's disease among methamphetamine consumers. New psychoactive substances (NPS) have effects that mimic those of more commonly abused drugs. In fact, a significant number of clinical reports of horrific cases, derived from NPS abuse, suggest that intensification of research is needed. Actually, NPS induces neuroinflammation that comprise microglial activation, astrogliosis, and lymphocytic infiltration and are known to contribute to several neurodegenerative diseases. Many NPS and illegal substances are smoked or ingested. However, current toxicological studies on cells use the NPS or standards substances not reflecting the combusted or digested products, which are taken by consumers. Knowing this, it seems that the current approach to study cellular and molecular toxicological impact of synthetic cannabinoids using standards, might not be the most promising. The present hypothesis for this PhD project is that synthetic cathinones and cannabinoids might represent risk factors at long term, increasing the propensity for neurodegeneration triggering PD among other neurodegenerative diseases. In this context, the main aim of the present PhD project is to characterize and understand the role of NPS as triggers of neurodegeneration and contribute to clarify the molecular mechanisms underlying it and study the relationship between NPS consumption and the increasing risk on the onset of sporadic forms of neurodegenerative diseases.

**Keywords:** Synthetic Cannabinoids; Synthetic Cathinones; Parkinson Disease;  $\alpha$ -synuclein

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**Start Year:** 2017